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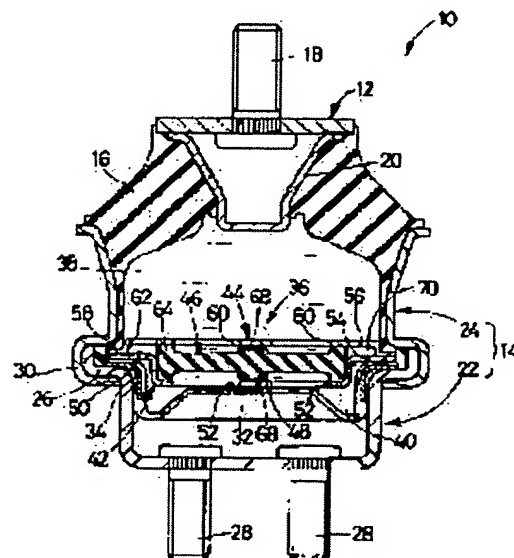
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(54) LIQUID ENCLOSED TYPE VIBRATION PROOFING MOUNT

(57)Abstract:

PURPOSE: To partition the inside into a pressure receiving chamber and a balancing chamber, and improve the manufacturing and assembly performance of a partition member consisting an orifice passage and a liquid pressure absorbing mechanism.

CONSTITUTION: First plate-like metal-fittings 42 made up of a bottomed cylindrical part 48 and a flange part 50, and second plate-like metal-fittings 44 made up of a bottomed cylindrical part 56 and a flange part 58 having the diameters larger than those of the bottomed cylindrical part 48 of the first plate-like metal-fittings 42, are overlapped on each other with their openings faced to each other. Then, a rubber membrane 46 is inserted into the bottomed cylindrical part 48 of the first plate-like metal-fittings 42 to position and hold the outer peripheral surface, and a ring-like projection 64 formed on the outer peripheral edge part of the rubber membrane 46 is caught and held under pressure between the plate-like metal-fittings 42, 44 to form an orifice passage 70 outside the ring-like projection 64 of the rubber membrane 46, in the bottomed cylindrical part 56 of the second plate-like metal-fittings 44.



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CLAIMS

[Claim(s)]

[Claim 1] While connecting the first dummy support and second dummy support with a rubber elasticity object The pressure receiving room where a part of wall was constituted from said rubber elasticity object by the both sides of the batch member supported by this second dummy support, While a part of wall forms the balanced room which consisted of flexible film and it encloses predetermined incompressible fluid with these pressure receiving room and a balanced room While preparing the orifice path which makes said batch member the superposition structure of the first plate and the second plate, and opens said pressure receiving room and said balanced room for free passage mutually into the periphery part between both [these] plates In fluid filled system vibrationproofing mounting which rubber membrane is arranged [mounting] in the central part between both [these] plates possible [displacement], and makes said pressure receiving room and a balanced room come to be open for free passage of the both sides of this rubber membrane, respectively Said the first plate and second plate as a hat configuration which consists of the closed-end cylindrical section and a flange, respectively While an opening side is opposed mutually and piling up, the closed-end cylindrical section of this second plate is made into a major diameter rather than the closed-end cylindrical section of this first plate. While inserting said rubber membrane in the closed-end cylindrical section of this first plate and carrying out positioning maintenance of the peripheral face By preparing an annular projected part in the periphery edge of this rubber membrane, and carrying out compression grasping of this annular projected part between said first and the second plate Fluid filled system vibrationproofing mounting characterized by having arranged this rubber membrane between these firsts and the second plate, and forming said orifice path in a periphery side from the annular projected part of this rubber membrane of said second plate closed-end cylindrical on the staff.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to fluid filled system vibrationproofing mounting which the orifice path was formed in the batch member into which a pressure receiving room and a balanced room are divided, and related to fluid filled system vibrationproofing mounting by which the vibrationproofing effectiveness is demonstrated based on a flow operation of the fluid which flows through this orifice path, especially was excellent in the manufacture nature and assemblability of a batch member.

[0002]

[Background of the Invention] The thing of the structure which comes to connect the first dummy support and second dummy support from the former with the rubber elasticity object in which it was infixed among them as a kind of mounting equipment which is infixed among members which constitute an oscillating transfer system, such as an engine mount for automobiles and body mounting, and carries out vibrationproofing connection of them is known. Moreover, in recent years, in order to acquire the more advanced vibrationproofing effectiveness, while forming the pressure receiving room and the balanced room where predetermined incompressible fluid was enclosed with the both sides of the batch member supported by the second dummy support, respectively, fluid filled system vibrationproofing mounting which comes to prepare the orifice path which opens these pressure receiving room and a balanced room for free passage mutually is proposed. Furthermore, in such fluid filled system vibrationproofing mounting, in order to improve the damping characteristic of a high-frequency region, rubber membrane is arranged possible [displacement] between a pressure receiving room and a balanced room, and the fluid pressure absorber style it was made to absorb small internal pressure fluctuation of a pressure receiving room based on the variation rate of this rubber membrane is adopted suitably.

[0003] It specifically sets to this fluid filled system vibrationproofing mounting. Generally, as indicated by JP,63-66643,U etc. The batch member into which a pressure receiving room and a balanced room are divided is made into the superposition structure of the plate (tabular metallic ornaments by which press forming was generally carried out) of two sheets. While an annular orifice path is formed in the periphery part between both [these] tabular metallic ornaments, rubber membrane is arranged possible [displacement] by the central part between both tabular metallic ornaments, the both sides of this rubber membrane are made open for free passage by a pressure receiving room and the balanced room, and the fluid pressure absorber style is constituted.

[0004] However, in order to adopt such a fluid pressure absorber style, it is necessary to divide the orifice path formed in a periphery part, and the arrangement part of the rubber membrane formed in a central part by carrying out the cavity of one tabular metallic ornaments annularly, and making the tabular metallic ornaments of another side contact by press working of sheet metal etc. When the partition by the orifice path and the arrangement part of rubber membrane is inadequate, the short circuit of an orifice path, leak of a fluid, etc. occur, and it becomes impossible to fully acquire the vibrationproofing effectiveness demonstrated based on a flow operation of a fluid in there.

[0005] Therefore, in the former, close dimensional accuracy was required of tabular metallic ornaments, in addition to the manufacture being difficult, a mounting damping characteristic tended to vary by the short circuit of an orifice path etc., the expected vibrationproofing effectiveness was stabilized, and there was a problem of being difficult to get.

[0006] In addition, while positioning these tabular metallic ornaments and rubber membrane with a rubber elasticity object by laying the tabular metallic ornaments of two sheets which present the shape of a disk type on both sides of rubber membrane on top of JP,60-252834,A, and inserting in a rubber elasticity object, vibrationproofing mounting equipped with the batch member of the structure which comes to form an annular orifice path between the peripheral face of rubber membrane and a rubber elasticity object is proposed.

[0007] However, it sets to this vibrationproofing mounting. Since it is necessary to perform positioning of the tabular metallic ornaments and rubber membrane which constitute a batch member to a rubber elasticity object at the time of with [to a rubber elasticity object] a group While the activity with a group of a batch member was troublesome, there was a problem that positioning accuracy was bad, there was a possibility that the configuration of an orifice path may moreover change with deformation of a rubber elasticity object and rubber membrane, and the stable vibrationproofing effectiveness was hard to be acquired.

[0008] Moreover, rubber membrane is put between [whole] the tabular metallic ornaments of two sheets which present an approximate circle plate configuration, JP,62-184254,A carries out compression maintenance, and vibrationproofing mounting equipped with the batch member of the structure which comes to form an orifice path by the annular concave formed at this rubber membrane is proposed.

[0009] However, in this vibrationproofing mounting, rubber membrane deformed according to the compression force exerted on rubber membrane by the tabular metallic ornaments of two sheets at the time of with a group, and in order that the configuration of the orifice path formed in rubber membrane might tend to have changed, there was a problem that the vibrationproofing effectiveness made into the purpose was hard to be acquired.

[0010] Furthermore, while preparing a neck annular into the periphery part of rubber membrane again, the annular engagement section which engages with these necks is projected and formed in JP,63-167141,A at the tabular metallic ornaments of two sheets, rubber membrane is held into a central part, and vibrationproofing mounting equipped with the batch member of the structure which comes to form an orifice path in the periphery side of rubber membrane is proposed.

[0011] However, in this vibrationproofing mounting, since each of rubber membrane and each tabular metallic ornaments served as a complicated configuration, while manufacture was difficult, there was a problem that the alignment at the time of with [of these each part material] a group was troublesome.

[0012]

[Problem(s) to be Solved] In here, it succeeds in this invention against the background of the situation like ****, and the place made into the solution technical problem is to offer fluid filled system vibrationproofing mounting which comes to have the batch member of new structure into which an orifice path and the arrangement part of the rubber membrane which constitutes a fluid pressure absorber style are divided with sufficient fluid-tight nature.

[0013] moreover, the manufacture from which this invention was constituted by the plate and rubber membrane of a simple configuration - also let it be the purpose to offer fluid filled system vibrationproofing mounting which comes to have an easy batch member.

[0014] Furthermore, this invention also makes it the purpose to offer fluid filled system vibrationproofing mounting which comes to have

the batch member which can perform attachment of rubber membrane to a plate with the outstanding positioning nature easily again.

[0015] Furthermore, this invention is equipped with the batch member by which change of the configuration of the orifice path by deformation of rubber membrane etc. is prevented as much as possible, and also makes it the purpose to offer fluid filled system vibrationproofing mounting which is stable and can acquire the vibrationproofing effectiveness into the purpose.

[0016]

[Means for Solution] In order to solve these technical problems, and the place by which it is characterized [of this invention] While connecting the first dummy support and second dummy support with a rubber elasticity object The pressure receiving room where a part of wall was constituted from said rubber elasticity object by the both sides of the batch member supported by this second dummy support, While a part of wall forms the balanced room which consisted of flexible film and it encloses predetermined incompressible fluid with these pressure receiving room and a balanced room While preparing the orifice path which makes said batch member the superposition structure of the first plate and the second plate, and opens said pressure receiving room and said balanced room for free passage mutually into the periphery part between both [these] plates In fluid filled system vibrationproofing mounting which rubber membrane is arranged [mounting] in the central part between both [these] plates possible [displacement], and makes said pressure receiving room and a balanced room come to be open for free passage of the both sides of this rubber membrane, respectively Said the first plate and second plate as a hat configuration which consists of the closed-end cylindrical section and a flange, respectively While an opening side is opposed mutually and piling up, the closed-end cylindrical section of this second plate is made into a major diameter rather than the closed-end cylindrical section of this first plate. While inserting said rubber membrane in the closed-end cylindrical section of this first plate and carrying out positioning maintenance of the peripheral face By preparing an annular projected part in the periphery edge of this rubber membrane, and carrying out compression grasping of this annular projected part between said first and the second plate This rubber membrane is arranged between these firsts and the second plate, and it is in having formed said orifice path in the periphery side from the annular projected part of this rubber membrane of said second plate closed-end cylindrical on the staff.

[0017]

[Effect of the Invention] In fluid filled system vibrationproofing mounting made into the structure of following such this invention By compressing the annular projected part formed in the periphery edge of rubber membrane between the first and the second plate This annular projected part functions as a sealant, since an orifice path and the arrangement part of the rubber membrane which constitutes a fluid pressure absorber style are divided with sufficient fluid-tight nature, the short circuit of an orifice path etc. is prevented and the stable vibrationproofing effectiveness may be demonstrated.

[0018] Moreover, in this fluid filled system vibrationproofing mounting, while the first and the second plate are formed by each with a simple hat configuration, since the seal nature of an orifice path is secured by the annular projected part of rubber membrane even if it does not send close dimensional accuracy so much, manufacture of a batch member, as a result mounting is easy.

[0019] Furthermore, in this fluid filled system vibrationproofing mounting, rubber membrane is only inserted in the closed-end cylindrical circles of the first plate, and since the peripheral face of rubber membrane covers the perimeter by the barrel wall section inner skin of this closed-end cylindrical section, it is held and it is positioned, while attachment of rubber membrane is easy, the outstanding positioning nature may be demonstrated again.

[0020] Furthermore, it sets to this fluid filled system mounting. Between the flange of the first plate, and the periphery part of the closed-end cylindrical section of the second plate The orifice path can be formed with these firsts and the second plate, and form status change-ization of the orifice path at the time of deformation of rubber membrane is prevented by it, and it becomes possible to be stabilized and to acquire the vibrationproofing effectiveness made into the purpose.

[0021]

[Example] Hereafter, in order to clarify this invention still more concretely, the example of this invention is explained to a detail, referring to a drawing.

[0022] First, the engine mount 10 for automobiles as an example of this invention is shown in drawing 1 . This engine mount 10 is made into the structure of coming to connect the first dummy support 12 and second dummy support 14 with the rubber elasticity object 16. And elastic support of the power unit is carried out to the body by attaching the first dummy support 12 or the second dummy support 14 in a body side, and attaching another side in a power-unit side, respectively. Moreover, a main vibration which should be carried out vibrationproofing in the opposite direction (the inside of drawing 1 . the vertical direction) of the first dummy support 12 and the second dummy support 14 will be inputted into an engine mount 10 under such a wearing condition.

[0023] more -- a detail -- the first dummy support 12 -- abbreviation -- the shape of a heavy-gage disk type is presented. Moreover, in the inferior surface of tongue of this first dummy support 12, the retainer 20 of the shape of a closed-end cylindrical shape which has the barrel wall section extended in the shape of a taper has fixed in opening. Furthermore, the mounting bolt 18 is projected and fixed to the central part of the first dummy support 12 by the method of outside.

[0024] On the other hand, the second dummy support 14 is constituted by the bottom metallic ornaments 22 which present the shape of an abbreviation closed-end cylindrical shape, and the metallic tube implement 24 which presents the shape of a cylindrical shape. The bottom metallic ornaments 22 have the outside flange 26 in the opening periphery section, and two mounting bolts 28 and 28 are projected and fixed to the bottom wall section by the method of outside. Furthermore, the metallic tube implement 24 has the caulking section 30 in opening of shaft-orientations another side while the barrel wall section by the side of shaft-orientations one opening is presenting the taper configuration. And the second dummy support 14 is formed by these bottoms metallic ornaments 22 and the metallic tube implement 24 putting on shaft orientations, making a flange 26 go away metallic tube implement 24 outside the bottom metallic ornaments 22, and carrying out caulking immobilization of the section 30.

[0025] Moreover, on the abbreviation same shaft, the first dummy support 12 and second dummy support 14 separate predetermined distance, opposite arrangement is carried out, and the rubber elasticity object 16 is infixed among them. This rubber elasticity object 16 is presenting the approximate circle frustum configuration as a whole, and while the minor diameter side edge side has fixed to the first dummy support 12, it has fixed to the metallic tube implement 24 with which a major-diameter side peripheral face constitutes the second dummy support 14, while the first dummy support 12 and second dummy support 14 are elastically connected with the rubber elasticity object 16 by it -- opening of the second dummy support 14 -- a fluid -- it is blocked densely.

[0026] Furthermore, inside the second dummy support 14, hold arrangement of the diaphragm 32 as flexible film is carried out. This diaphragm 32 is constituted by light-gage rubber, and the annular fixing metal 34 has fixed in the periphery edge. And this diaphragm 32 is attached to the second dummy support 14 by making the periphery edge which fixing metal 34 fixed go away metallic tube implement 24 with the bottom metallic ornaments 22, and being pinched in the section. it -- the interior of the second dummy support 14 -- diaphragm 32 -- the metallic tube implement 24 side and the bottom metallic-ornaments 22 side -- a fluid -- it is divided densely.

[0027] Moreover, inside the second dummy support 14, from diaphragm 32, it is located in the metallic tube implement 24 side, and hold arrangement of the batch member 36 is carried out. An approximate circle board configuration is presented as a whole, and this batch member 36 piles up a periphery edge on the periphery edge of diaphragm 32, with this diaphragm 32, it is made to go away metallic tube implement 24 with the bottom metallic ornaments 22, and is pinched in the section.

[0028] the sealing room which the batch member 36 is attached fixed to the second dummy support 14 by it, and was formed between the rubber elasticity object 16 and diaphragm 32 of this batch member 36 -- the rubber elasticity object 16 side and a diaphragm 32 side -- a

fluid — it is densely divided into two.

[0029] Furthermore, predetermined incompressible fluid, such as water, alkylene glycol, a polyalkylene glycol, and silicon oil, is enclosed with the sealing room bisected by this batch member 36. In addition, it may succeed in enclosure of the fluid to a sealing room advantageously by performing attachment of the batch member 36 and diaphragm 32 in a fluid etc.

[0030] Thereby, the pressure receiving room 38 where a part of wall consists of rubber elasticity object 16 at a side (the first dummy support 12 side), and internal pressure fluctuation is caused based on deformation of the rubber elasticity object 16 at the time of an oscillating input while it is located on both sides of the batch member 36 is formed. Moreover, a part of wall consists of diaphragms 32, and the balanced room 40 where volume change is permitted based on deformation of this diaphragm 32 is formed in the another side side in which it is located on both sides of the batch member 36.

[0031] Moreover, the batch member 36 into which these pressure receiving room 38 and the balanced room 40 are divided is made into the structure of the first tabular metallic ornaments 42 and the second tabular metallic ornaments 44 which were formed of press forming etc., respectively piling up, and coming to unite them on both sides of rubber membrane 46.

[0032] The first tabular metallic ornaments 42 are presenting the hat configuration which consists of the closed-end cylindrical section 48 and the flange 50 of a shallow bottom as shown also in drawing 2 and drawing 3. Moreover, four through-holes 52 are formed in the bottom wall section of the closed-end cylindrical section 48. Furthermore, one free passage hole 54 is formed in the flange 50 ranging over between the barrel wall sections of the closed-end cylindrical section 48.

[0033] Moreover, on the other hand, the second tabular metallic ornaments 44 are presenting the hat configuration which consists of the closed-end cylindrical section 56 and the flange 58 of a shallow bottom like the first tabular metallic ornaments 42 and abbreviation as shown also in drawing 4 and drawing 5. In there, as for the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, the bore is greatly set up rather than the closed-end cylindrical section 48 of the first tabular metallic ornaments 42. Furthermore, while four through-holes 60 are formed in the central part of the bottom wall section of the closed-end cylindrical section 56, one free passage hole 62 is formed in the periphery edge of this bottom wall section.

[0034] Moreover, the outer diameter of the closed-end cylindrical section 56 of these second tabular metallic ornaments 44 is slightly set up small from the bore and abbreviation identities of the pressure receiving room 38 which were formed in the metallic tube implement 24, or it, and the thing for which the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is inserted in in the metallic tube implement 24 on the occasion of attachment of the batch member 36 — this — the positioning set of the second tabular metallic ornaments 44 is carried out to the metallic tube implement 24.

[0035] Then, the tabular metallic ornaments 42 of these first and the second tabular metallic ornaments 44 are put on shaft orientations, as opening of the closed-end cylindrical sections 48 and 56 faces mutually. Of it, the dead air space of an approximate circle plate configuration is formed between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, and hold arrangement of the rubber membrane 46 is carried out into this dead air space.

[0036] The approximate circle plate configuration is presented as a whole, and let that outer diameter be the bore of the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and abbreviation identities as this rubber membrane 46 is shown also in drawing 6 and drawing 7. Moreover, the annular projected part 64 which projects in predetermined height on shaft-orientations both sides follows a hoop direction, and is formed in the periphery edge of rubber membrane 46. This annular projected part 64 is slightly set up greatly from the inside dimension method and abbreviation identities between the bottom wall sections of the first [which the total height of shaft orientations piled up], and second closed-end cylindrical sections 48 and 56 of the tabular metallic ornaments 42 and 44, or it.

[0037] In addition, on the shaft-orientations both-ends side of the annular projected part 64, the annular seal lip 66 is formed, respectively. Moreover, the contact projection 68 is projected and formed in four places of the circumference of the core of rubber membrane 46, and this core in height lower than the annular projected part 64, respectively.

[0038] And this rubber membrane 46 is inserted in the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and positioning maintenance is carried out when the peripheral face is contacted by the inner skin of the closed-end cylindrical section 48. Furthermore, the shaft-orientations both-ends side is made to contact the bottom wall section of the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the bottom wall section of the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, and compression grasping of the annular projected part 64 of rubber membrane 46 is carried out between both [these] the bottom wall sections at shaft orientations.

[0039] the dead air space formed of it between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 — the annular projected part 64 of rubber membrane 46 — this annular projected part 64 — a part for a part for an inner circumference flank, and a periphery flank — a fluid — it is divided densely. That is, the annular dead air space where the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is prolonged in a periphery side rather than the annular projected part 64 of rubber membrane 46 in a hoop direction by considering as the major diameter rather than the closed-end cylindrical section 48 of the first tabular metallic ornaments 42 is formed in the closed-end cylindrical section 56 of the second tabular metallic ornaments 44.

[0040] And when this annular dead air space is opened for free passage by the balanced room 40 and the pressure receiving room 38 through the free passage holes 54 and 62 prepared in the first and second tabular metallic ornaments 42 and 44, the orifice path 70 which opens these pressure receiving room 38 and the balanced room 40 for free passage mutually is formed.

[0041] In addition, in this example, the first tabular metallic ornaments 42 and the second tabular metallic ornaments 44 are positioned in the hoop direction, and two orifice paths 70 and 70 which extend by the die length of 1/2 round of abbreviation are formed in the hoop direction of it, respectively so that the free passage hole 54 and the free passage hole 62 may carry out an opposite location in the direction of a path mutually. Moreover, in this example, based on the resonance operation of the fluid which flows through this orifice path 70, the cross section and die length of each orifice path 70 are set up so that a damping effect may be demonstrated at the time of the input of subsonic vibration, such as a shake.

[0042] moreover, the circular dead air space formed rather than the annular projected part 64 of rubber membrane 46 on the other hand at the inner circumference side between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 — rubber membrane 46 — the first tabular metallic ornaments 42 side and the second tabular metallic ornaments 44 side — a fluid — it is divided densely. Furthermore, the dead air space by the side of the tabular metallic ornaments 42 of them first and the dead air space by the side of the second tabular metallic ornaments 44 are opened for free passage by the balanced room 40 and the pressure receiving room 38 through the through-holes 52 and 60 prepared in the first and second tabular metallic ornaments 42 and 44, respectively.

[0043] When the internal pressure of the pressure receiving room 38 and the balanced room 40 is exerted on the both sides of rubber membrane 46 by it and rubber membrane 46 is made to deform based on the internal pressure difference which it is between both [these] ** 38 and 40, the fluid pressure absorber style which permits the little fluid flow between the pressure receiving room 38 and the balanced room 40, and absorbs internal pressure fluctuation of the pressure receiving room 38 is constituted.

[0044] In addition, this rubber membrane 46 is positioned to the first and second tabular metallic ornaments 42 and 44 so that the contact projection 68 may carry out an opposite location at the part in which the through-holes 52 and 60 in the first and second tabular metallic

ornaments 42 and 44 are not formed, respectively. And the amount of displacement of rubber membrane 46, as a result the amount of fluid circulation made to flow based on deformation of rubber membrane 46 are regulated by the contact to the first [of the contact projection 68], and second tabular metallic ornaments 42 and 44.

[0045] Moreover, in this example, the magnitude of through-holes 52 and 60 etc. is set up so that they may be filled and the low dynamic spring effectiveness may be demonstrated on a flow operation of the fluid made to flow based on deformation of rubber membrane 46 at the time of the input of high frequency oscillation, such as a sound.

[0046] Therefore, in the engine mount 10 made into the structure like ****, this annular projected part 64 functions as a sealant which divides the arrangement parts of the orifice path 70 and rubber membrane 46 by compressing the annular projected part 64 formed in the periphery edge of rubber membrane 46 between the first and second tabular metallic ornaments.

[0047] So, the orifice path 70 and the arrangement part of rubber membrane 46 will be divided with sufficient fluid-tight nature, the short circuit of the orifice path 70 etc. is prevented, effectively, it is stabilized and the vibrationproofing effectiveness made into the purpose may be demonstrated.

[0048] Moreover, in this engine mount 10, since it is not necessary to the first and second tabular metallic ornaments 42 and 44 to project and to form the septum with which the orifice path 70 and the arrangement part of rubber membrane 46 are divided, the these firsts and second tabular metallic ornaments 42 and 44 all have a simple hat configuration, and are formed.

[0049] So, the manufacture nature of mounting may improve by leaps and bounds, without requiring advanced dimensional accuracy, while the first and second manufactures of the tabular metallic ornaments 42 and 44 become easy.

[0050] Furthermore, in this engine mount 10, rubber membrane 46 is only inserted into the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the peripheral face of rubber membrane 46 covers the perimeter by the barrel wall section inner skin of this closed-end cylindrical section 48, and it is held, and is positioned again.

[0051] So, it may succeed in attachment to the first [of rubber membrane 46], and second tabular metallic ornaments 42 and 44 easily with the outstanding positioning nature, and further improvement in mounting manufacture nature and stabilization of the engine performance may be attained by it.

[0052] Furthermore, in the engine mount 10 of this example, since the orifice path 70 is formed between the flange 50 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, deformation of the orifice path 70 may be prevented advantageously.

[0053] So, the configuration of the orifice path 70 may be maintained advantageously, advantageous, it is stabilized and the expected vibrationproofing effectiveness based on a flow operation of the fluid made to flow through this orifice path 70 may be demonstrated.

[0054] Moreover, in the engine mount 10 of this example, since the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is inserted in in the metallic tube implement 24, while it is easy at the time of with a group to carry out the positioning set of the batch member 36 at the second dummy support 14 and improvement in assembly-operation nature is achieved, automatic assembly and set-ization also have easily the advantage of being realizable.

[0055] Furthermore, it is possible to secure the substantial orifice cross section from the free passage hole 54 and two orifice paths 70 and 70 which extend between 62 toward hoop direction both sides being formed between the pressure receiving room 38 and the balanced room 40 in the engine mount 10 of this example again greatly, and the vibrationproofing effectiveness based on a flow operation of a fluid can be acquired much more advantageous.

[0056] As mentioned above, although the example of this invention has been explained in full detail, this is literal instantiation, and this invention is limited only to this example and interpreted.

[0057] For example, the batch member 36 is arranged so that the first tabular metallic ornaments 42 may be located in the pressure receiving room 38 side and the second tabular metallic ornaments 44 may be located in the balanced room 40 side, respectively, and you may make it the direction of the closed-end cylindrical section of tabular metallic ornaments located in the balanced room 40 side serve as a major diameter from the closed-end cylindrical section of tabular metallic ornaments located in the pressure receiving room 38 side.

[0058] Moreover, although two orifice paths 70 and 70 which extend by the die length of an abbreviation semicircle were formed in the hoop direction in the periphery edge of the batch member 36 in said example, respectively, it is also possible to adopt as a hoop direction one orifice path which extends by the die length below a semicircle or more than a semicircle.

[0059] In addition, the orifice path which extends by the die length of round weakness in a hoop direction the periphery edge of the batch member 36 For example, while preparing the batch projection which divides with one on a periphery the annular dead air space formed from the peripheral face at the method of the outside of the direction of a path between a projection, the first tabular metallic ornaments 42, and the second tabular metallic ornaments 44 to rubber membrane 46 On both sides of this batch projection, it is advantageously formed by opening annular dead air space for free passage in the pressure receiving room 38 and the balanced room 40.

[0060] Moreover, it is also possible to form in the annular projected part 64 the annular concave which is open for free passage in annular dead air space in addition to such a batch projection, and to make the interior of the batch member 36 into the orifice path which extends by the die length more than a round.

[0061] Furthermore, although the batch member 36 is positioned by the second dummy support 14 in said example by inserting in the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 in the metallic tube implement 24, such positioning structure is not indispensable in this invention.

[0062] Moreover, although each of first and second plate was constituted from said example by the tabular metallic ornaments formed of press forming etc., it is also possible to form both these firsts, and the second both [one side or] with hard material, such as rigid resin, also in such a case, the manufacture disposition superiors by simplification of a die are planned, and the same effectiveness as said example may be demonstrated.

[0063] in addition -- although this invention was applied to the engine mount for automobiles and one example was shown in said example -- this invention -- in addition, body mounting for automobiles -- or all may be advantageously applied to various kinds of vibrationproofing mountings of those other than an automobile.

[0064] In addition, although listing is not carried out one by one, this invention may be carried out in the mode which added modification which becomes various, correction, amelioration, etc. based on this contractor's knowledge, and unless such an embodiment deviates from the meaning of this invention, all are contained within the limits of this invention.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to fluid filled system vibrationproofing mounting which the orifice path was formed in the batch member into which a pressure receiving room and a balanced room are divided, and related to fluid filled system vibrationproofing mounting by which the vibrationproofing effectiveness is demonstrated based on a flow operation of the fluid which flows through this orifice path, especially was excellent in the manufacture nature and assemblability of a batch member.

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PRIOR ART

[Background of the Invention] The thing of the structure which comes to connect the first dummy support and second dummy support from the former with the rubber elasticity object in which it was infixed among them as a kind of mounting equipment which is infixed among members which constitute an oscillating transfer system, such as an engine mount for automobiles and body mounting, and carries out vibrationproofing connection of them is known. Moreover, in recent years, in order to acquire the more advanced vibrationproofing effectiveness, while forming the pressure receiving room and the balanced room where predetermined incompressible fluid was enclosed with the both sides of the batch member supported by the second dummy support, respectively, fluid filled system vibrationproofing mounting which comes to prepare the orifice path which opens these pressure receiving room and a balanced room for free passage mutually is proposed. Furthermore, in such fluid filled system vibrationproofing mounting, in order to improve the damping characteristic of a high-frequency region, rubber membrane is arranged possible [displacement] between a pressure receiving room and a balanced room, and the fluid pressure absorber style it was made to absorb small internal pressure fluctuation of a pressure receiving room based on the variation rate of this rubber membrane is adopted suitably.

[0003] It specifically sets to this fluid filled system vibrationproofing mounting. Generally, as indicated by JP,63-66643,U etc. The batch member into which a pressure receiving room and a balanced room are divided is made into the superposition structure of the plate (tabular metallic ornaments by which press forming was generally carried out) of two sheets. While an annular orifice path is formed in the periphery part between both [these] tabular metallic ornaments, rubber membrane is arranged possible [displacement] by the central part between both tabular metallic ornaments, the both sides of this rubber membrane are made open for free passage by a pressure receiving room and the balanced room, and the fluid pressure absorber style is constituted.

[0004] However, in order to adopt such a fluid pressure absorber style, it is necessary to divide the orifice path formed in a periphery part, and the arrangement part of the rubber membrane formed in a central part by carrying out the cavity of one tabular metallic ornaments annularly, and making the tabular metallic ornaments of another side contact by press working of sheet metal etc. When the partition by the orifice path and the arrangement part of rubber membrane is inadequate, the short circuit of an orifice path, leak of a fluid, etc. occur, and it becomes impossible to fully acquire the vibrationproofing effectiveness demonstrated based on a flow operation of a fluid in there.

[0005] Therefore, in the former, close dimensional accuracy was required of tabular metallic ornaments, in addition to the manufacture being difficult, a mounting damping characteristic tended to vary by the short circuit of an orifice path etc., the expected vibrationproofing effectiveness was stabilized, and there was a problem of being difficult to get.

[0006] In addition, while positioning these tabular metallic ornaments and rubber membrane with a rubber elasticity object by laying the tabular metallic ornaments of two sheets which present the shape of a disk type on both sides of rubber membrane on top of JP,60-252834,A, and inserting in a rubber elasticity object, vibrationproofing mounting equipped with the batch member of the structure which comes to form an annular orifice path between the peripheral face of rubber membrane and a rubber elasticity object is proposed.

[0007] However, it sets to this vibrationproofing mounting. Since it is necessary to perform positioning of the tabular metallic ornaments and rubber membrane which constitute a batch member to a rubber elasticity object at the time of with [to a rubber elasticity object] a group While the activity with a group of a batch member was troublesome, there was a problem that positioning accuracy was bad, there was a possibility that the configuration of an orifice path may moreover change with deformation of a rubber elasticity object and rubber membrane, and the stable vibrationproofing effectiveness was hard to be acquired.

[0008] Moreover, rubber membrane is put between [whole] the tabular metallic ornaments of two sheets which present an approximate circle plate configuration, JP,62-184254,A carries out compression maintenance, and vibrationproofing mounting equipped with the batch member of the structure which comes to form an orifice path by the annular concave formed at this rubber membrane is proposed.

[0009] However, in this vibrationproofing mounting, rubber membrane deformed according to the compression force exerted on rubber membrane by the tabular metallic ornaments of two sheets at the time of with a group, and in order that the configuration of the orifice path formed in rubber membrane might tend to have changed, there was a problem that the vibrationproofing effectiveness made into the purpose was hard to be acquired.

[0010] Furthermore, while preparing a neck annular into the periphery part of rubber membrane again, the annular engagement section which engages with these necks is projected and formed in JP,63-167141,A at the tabular metallic ornaments of two sheets, rubber membrane is held into a central part, and vibrationproofing mounting equipped with the batch member of the structure which comes to form an orifice path in the periphery side of rubber membrane is proposed.

[0011] However, in this vibrationproofing mounting, since each of rubber membrane and each tabular metallic ornaments served as a complicated configuration, while manufacture was difficult, there was a problem that the alignment at the time of with [of these each part material] a group was troublesome.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] In fluid filled system vibrationproofing mounting made into the structure of following such this invention By compressing the annular projected part formed in the periphery edge of rubber membrane between the first and the second plate This annular projected part functions as a sealant, since an orifice path and the arrangement part of the rubber membrane which constitutes a fluid pressure absorber style are divided with sufficient fluid-tight nature, the short circuit of an orifice path etc. is prevented and the stable vibrationproofing effectiveness may be demonstrated.

[0018] Moreover, in this fluid filled system vibrationproofing mounting, while the first and the second plate are formed by each with a simple hat configuration, since the seal nature of an orifice path is secured by the annular projected part of rubber membrane even if it does not send close dimensional accuracy so much, manufacture of a batch member, as a result mounting is easy.

[0019] Furthermore, in this fluid filled system vibrationproofing mounting, rubber membrane is only inserted in the closed-end cylindrical circles of the first plate, and since the peripheral face of rubber membrane covers the perimeter by the barrel wall section inner skin of this closed-end cylindrical section, it is held and it is positioned, while attachment of rubber membrane is easy, the outstanding positioning nature may be demonstrated again.

[0020] Furthermore, it sets to this fluid filled system mounting. Between the flange of the first plate, and the periphery part of the closed-end cylindrical section of the second plate The orifice path can be formed with these firsts and the second plate, and form status change-ization of the orifice path at the time of deformation of rubber membrane is prevented by it, and it becomes possible to be stabilized and to acquire the vibrationproofing effectiveness made into the purpose.

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TECHNICAL PROBLEM

[Problem(s) to be Solved] In here, it succeeds in this invention against the background of the situation like ***, and the place made into the solution technical problem is to offer fluid filled system vibrationproofing mounting which comes to have the batch member of new structure into which an orifice path and the arrangement part of the rubber membrane which constitutes a fluid pressure absorber style are divided with sufficient fluid-tight nature.

[0013] moreover, the manufacture from which this invention was constituted by the plate and rubber membrane of a simple configuration - also let it be the purpose to offer fluid filled system vibrationproofing mounting which comes to have an easy batch member.

[0014] Furthermore, this invention also makes it the purpose to offer fluid filled system vibrationproofing mounting which comes to have the batch member which can perform attachment of rubber membrane to a plate with the outstanding positioning nature easily again.

[0015] Furthermore, this invention is equipped with the batch member by which change of the configuration of the orifice path by deformation of rubber membrane etc. is prevented as much as possible, and also makes it the purpose to offer fluid filled system vibrationproofing mounting which is stabilized and can acquire the vibrationproofing effectiveness made into the purpose.

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MEANS

[Means for Solution] In order to solve these technical problems, and the place by which it is characterized [of this invention] While connecting the first dummy support and second dummy support with a rubber elasticity object The pressure receiving room where a part of wall was constituted from said rubber elasticity object by the both sides of the batch member supported by this second dummy support. While a part of wall forms the balanced room which consisted of flexible film and it encloses predetermined incompressible fluid with these pressure receiving room and a balanced room While preparing the orifice path which makes said batch member the superposition structure of the first plate and the second plate, and opens said pressure receiving room and said balanced room for free passage mutually into the periphery part between both [these] plates In fluid filled system vibrationproofing mounting which rubber membrane is arranged [mounting] in the central part between both [these] plates possible [displacement], and makes said pressure receiving room and a balanced room come to be open for free passage of the both sides of this rubber membrane, respectively Said the first plate and second plate as a hat configuration which consists of the closed-end cylindrical section and a flange, respectively While an opening side is opposed mutually and piling up, the closed-end cylindrical section of this second plate is made into a major diameter rather than the closed-end cylindrical section of this first plate. While inserting said rubber membrane in the closed-end cylindrical section of this first plate and carrying out positioning maintenance of the peripheral face By preparing an annular projected part in the periphery edge of this rubber membrane, and carrying out compression grasping of this annular projected part between said first and the second plate This rubber membrane is arranged between these firsts and the second plate, and it is in having formed said orifice path in the periphery side from the annular projected part of this rubber membrane of said second plate closed-end cylindrical on the staff.

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EXAMPLE

[Example] Hereafter, in order to clarify this invention still more concretely, the example of this invention is explained to a detail, referring to a drawing.

[0022] First, the engine mount 10 for automobiles as an example of this invention is shown in drawing 1. This engine mount 10 is made into the structure of coming to connect the first dummy support 12 and second dummy support 14 with the rubber elasticity object 16. And elastic support of the power unit is carried out to the body by attaching the first dummy support 12 or the second dummy support 14 in a body side, and attaching another side in a power-unit side, respectively. Moreover, a main vibration which should be carried out vibrationproofing in the opposite direction (the inside of drawing 1, the vertical direction) of the first dummy support 12 and the second dummy support 14 will be inputted into an engine mount 10 under such a wearing condition.

[0023] more -- a detail -- the first dummy support 12 -- abbreviation -- the shape of a heavy-gage disk type is presented. Moreover, in the inferior surface of tongue of this first dummy support 12, the retainer 20 of the shape of a closed-end cylindrical shape which has the barrel wall section extended in the shape of a taper has fixed in opening. Furthermore, the mounting bolt 18 is projected and fixed to the central part of the first dummy support 12 by the method of outside.

[0024] On the other hand, the second dummy support 14 is constituted by the bottom metallic ornaments 22 which present the shape of an abbreviation closed-end cylindrical shape, and the metallic tube implement 24 which presents the shape of a cylindrical shape. The bottom metallic ornaments 22 have the outside flange 26 in the opening periphery section, and two mounting bolts 28 and 28 are projected and fixed to the bottom wall section by the method of outside. Furthermore, the metallic tube implement 24 has the caulking section 30 in opening of shaft-orientations another side while the barrel wall section by the side of shaft-orientations one opening is presenting the taper configuration. And the second dummy support 14 is formed by these bottoms metallic ornaments 22 and the metallic tube implement 24 putting on shaft orientations, making a flange 26 go away metallic tube implement 24 outside the bottom metallic ornaments 22, and carrying out caulking immobilization of the section 30.

[0025] Moreover, on the abbreviation same shaft, the first dummy support 12 and second dummy support 14 separate predetermined distance, opposite arrangement is carried out, and the rubber elasticity object 16 is infixed among them. This rubber elasticity object 16 is presenting the approximate circle frustum configuration as a whole, and while the minor diameter side edge side has fixed to the first dummy support 12, it has fixed to the metallic tube implement 24 with which a major-diameter side peripheral face constitutes the second dummy support 14, while the first dummy support 12 and second dummy support 14 are elastically connected with the rubber elasticity object 16 by it -- opening of the second dummy support 14 -- a fluid -- it is blockaded densely.

[0026] Furthermore, inside the second dummy support 14, hold arrangement of the diaphragm 32 as flexible film is carried out. This diaphragm 32 is constituted by light-gage rubber, and the annular fixing metal 34 has fixed in the periphery edge. And this diaphragm 32 is attached to the second dummy support 14 by making the periphery edge which fixing metal 34 fixed go away metallic tube implement 24 with the bottom metallic ornaments 22, and being pinched in the section. it -- the interior of the second dummy support 14 -- diaphragm 32 -- the metallic tube implement 24 side and the bottom metallic-ornaments 22 side -- a fluid -- it is divided densely.

[0027] Moreover, inside the second dummy support 14, from diaphragm 32, it is located in the metallic tube implement 24 side, and hold arrangement of the batch member 36 is carried out. An approximate circle board configuration is presented as a whole, and this batch member 36 piles up a periphery edge on the periphery edge of diaphragm 32, with this diaphragm 32, it is made to go away metallic tube implement 24 with the bottom metallic ornaments 22, and is pinched in the section.

[0028] the sealing room which the batch member 36 is attached fixed to the second dummy support 14 by it, and was formed between the rubber elasticity object 16 and diaphragm 32 of this batch member 36 -- the rubber elasticity object 16 side and a diaphragm 32 side -- a fluid -- it is densely divided into two.

[0029] Furthermore, predetermined incompressible fluid, such as water, alkylene glycol, a polyalkylene glycol, and silicon oil, is enclosed with the sealing room bisected by this batch member 36. In addition, it may succeed in enclosure of the fluid to a sealing room advantageously by performing attachment of the batch member 36 and diaphragm 32 in a fluid etc.

[0030] Thereby, the pressure receiving room 38 where a part of wall consists of rubber elasticity objects 16 at a side (the first dummy support 12 side), and internal pressure fluctuation is caused based on deformation of the rubber elasticity object 16 at the time of an oscillating input while it is located on both sides of the batch member 36 is formed. Moreover, a part of wall consists of diaphragms 32, and the balanced room 40 where volume change is permitted based on deformation of this diaphragm 32 is formed in the another side side in which it is located on both sides of the batch member 36.

[0031] Moreover, the batch member 36 into which these pressure receiving room 38 and the balanced room 40 are divided is made into the structure of the first tabular metallic ornaments 42 and the second tabular metallic ornaments 44 which were formed of press forming etc., respectively piling up, and coming to unite them on both sides of rubber membrane 46.

[0032] The first tabular metallic ornaments 42 are presenting the hat configuration which consists of the closed-end cylindrical section 48 and the flange 50 of a shallow bottom as shown also in drawing 2 and drawing 3. Moreover, four through-holes 52 are formed in the bottom wall section of the closed-end cylindrical section 48. Furthermore, one free passage hole 54 is formed in the flange 50 ranging over between the barrel wall sections of the closed-end cylindrical section 48.

[0033] Moreover, on the other hand, the second tabular metallic ornaments 44 are presenting the hat configuration which consists of the closed-end cylindrical section 56 and the flange 58 of a shallow bottom like the first tabular metallic ornaments 42 and abbreviation as shown also in drawing 4 and drawing 5. In there, as for the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, the bore is greatly set up rather than the closed-end cylindrical section 48 of the first tabular metallic ornaments 42. Furthermore, while four through-holes 60 are formed in the central part of the bottom wall section of the closed-end cylindrical section 56, one free passage hole 62 is formed in the periphery edge of this bottom wall section.

[0034] Moreover, the outer diameter of the closed-end cylindrical section 56 of these second tabular metallic ornaments 44 is slightly set up small from the bore and abbreviation identitas of the pressure receiving room 38 which were formed in the metallic tube implement 24, or it, and the thing for which the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is inserted in the metallic tube implement 24 on the occasion of attachment of the batch member 36 -- this -- the positioning set of the second tabular metallic

ornaments 44 is carried out to the metallic tube implement 24.

[0035] Then, the tabular metallic ornaments 42 of these first and the second tabular metallic ornaments 44 are put on shaft orientations, as opening of the closed-end cylindrical sections 48 and 56 faces mutually. Of it, the dead air space of an approximate circle plate configuration is formed between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, and hold arrangement of the rubber membrane 46 is carried out into this dead air space.

[0036] The approximate circle plate configuration is presented as a whole, and let that outer diameter be the bore of the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and abbreviation identifies as this rubber membrane 46 is shown also in drawing 6 and drawing 7. Moreover, the annular projected part 64 which projects in predetermined height on shaft-orientations both sides follows a hoop direction, and is formed in the periphery edge of rubber membrane 46. This annular projected part 64 is slightly set up greatly from the inside dimension method and abbreviation identifies between the bottom wall sections of the first [which the total height of shaft orientations piled up], and second closed-end cylindrical sections 48 and 56 of the tabular metallic ornaments 42 and 44, or it.

[0037] In addition, on the shaft-orientations both-ends side of the annular projected part 64, the annular seal lip 66 is formed, respectively. Moreover, the contact projection 68 is projected and formed in four places of the circumference of the core of rubber membrane 46, and this core in height lower than the annular projected part 64, respectively.

[0038] And this rubber membrane 46 is inserted in the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and positioning maintenance is carried out when the peripheral face is contacted by the inner skin of the closed-end cylindrical section 48. Furthermore, the shaft-orientations both-ends side is made to contact the bottom wall section of the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the bottom wall section of the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, and compression grasping of the annular projected part 64 of rubber membrane 46 is carried out between both [these] the bottom wall sections at shaft orientations.

[0039] the dead air space formed of it between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 -- the annular projected part 64 of rubber membrane 46 -- this annular projected part 64 -- a part for a part for an inner circumference flank, and a periphery flank -- a fluid -- it is divided densely. That is, the annular dead air space where the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is prolonged in a periphery side rather than the annular projected part 64 of rubber membrane 46 in a hoop direction by considering as the major diameter rather than the closed-end cylindrical section 48 of the first tabular metallic ornaments 42 is formed in the closed-end cylindrical section 56 of the second tabular metallic ornaments 44.

[0040] And when this annular dead air space is opened for free passage by the balanced room 40 and the pressure receiving room 38 through the free passage holes 54 and 62 prepared in the first and second tabular metallic ornaments 42 and 44, the orifice path 70 which opens these pressure receiving room 38 and the balanced room 40 for free passage mutually is formed.

[0041] In addition, in this example, the first tabular metallic ornaments 42 and the second tabular metallic ornaments 44 are positioned in the hoop direction, and two orifice paths 70 and 70 which extend by the die length of 1/2 round of abbreviation are formed in the hoop direction of it, respectively so that the free passage hole 54 and the free passage hole 62 may carry out an opposite location in the direction of a path mutually. Moreover, in this example, based on the resonance operation of the fluid which flows through this orifice path 70, the cross section and die length of each orifice path 70 are set up so that a damping effect may be demonstrated at the time of the input of subsonic vibration, such as a shake.

[0042] moreover, the circular dead air space formed rather than the annular projected part 64 of rubber membrane 46 on the other hand at the inner circumference side between the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 -- rubber membrane 46 -- the first tabular metallic-ornaments 42 side and the second tabular metallic-ornaments 44 side -- a fluid -- it is divided densely. Furthermore, the dead air space by the side of the tabular metallic ornaments 42 of them first and the dead air space by the side of the second tabular metallic ornaments 44 are opened for free passage by the balanced room 40 and the pressure receiving room 38 through the through-holes 52 and 60 prepared in the first and second tabular metallic ornaments 42 and 44, respectively.

[0043] When the internal pressure of the pressure receiving room 38 and the balanced room 40 is exerted on the both sides of rubber membrane 46 by it and rubber membrane 46 is made to deform based on the internal pressure difference which it is between both [these] ** 38 and 40, the fluid pressure absorber style which permits the little fluid flow between the pressure receiving room 38 and the balanced room 40, and absorbs internal pressure fluctuation of the pressure receiving room 38 is constituted.

[0044] In addition, this rubber membrane 46 is positioned to the first and second tabular metallic ornaments 42 and 44 so that the contact projection 68 may carry out an opposite location at the part in which the through-holes 52 and 60 in the first and second tabular metallic ornaments 42 and 44 are not formed, respectively. And the amount of displacement of rubber membrane 46, as a result the amount of fluid circulation made to flow based on deformation of rubber membrane 46 are regulated by the contact to the first [of the contact projection 68], and second tabular metallic ornaments 42 and 44.

[0045] Moreover, in this example, the magnitude of through-holes 52 and 60 etc. is set up so that it may be filled and the low dynamic spring effectiveness may be demonstrated based on a flow operation of the fluid made to flow based on deformation of rubber membrane 46 at the time of the input of high frequency oscillation, such as a sound.

[0046] Therefore, in the engine mount 10 made into the structure like ****, this annular projected part 64 functions as a sealant which divides the arrangement parts of the orifice path 70 and rubber membrane 46 by compressing the annular projected part 64 formed in the periphery edge of rubber membrane 46 between the first and second tabular metallic ornaments.

[0047] So, the orifice path 70 and the arrangement part of rubber membrane 46 will be divided with sufficient fluid-tight nature, the short circuit of the orifice path 70 etc. is prevented, effectively, it is stabilized and the vibrationproofing effectiveness made into the purpose may be demonstrated.

[0048] Moreover, in this engine mount 10, since it is not necessary to the first and second tabular metallic ornaments 42 and 44 to project and to form the septum with which the orifice path 70 and the arrangement part of rubber membrane 46 are divided, the these firsts and second tabular metallic ornaments 42 and 44 all have a simple hat configuration, and are formed.

[0049] So, the manufacture nature of mounting may improve by leaps and bounds, without requiring advanced dimensional accuracy, while the first and second manufactures of the tabular metallic ornaments 42 and 44 become easy.

[0050] Furthermore, in this engine mount 10, rubber membrane 46 is only inserted into the closed-end cylindrical section 48 of the first tabular metallic ornaments 42, and the peripheral face of rubber membrane 46 covers the perimeter by the barrel wall section inner skin of this closed-end cylindrical section 48, and it is held, and is positioned again.

[0051] So, it may succeed in attachment to the first [of rubber membrane 46], and second tabular metallic ornaments 42 and 44 easily with the outstanding positioning nature, and further improvement in mounting manufacture nature and stabilization of the engine performance may be attained by it.

[0052] Furthermore, in the engine mount 10 of this example, since the orifice path 70 is formed between the flange 50 of the first tabular metallic ornaments 42, and the closed-end cylindrical section 56 of the second tabular metallic ornaments 44, deformation of the orifice path 70 may be prevented advantageously.

[0053] So, the configuration of the orifice path 70 may be maintained advantageously, advantageous, it is stabilized and the expected vibrationproofing effectiveness based on a flow operation of the fluid made to flow through this orifice path 70 may be demonstrated.

[0054] Moreover, in the engine mount 10 of this example, since the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 is inserted in the metallic tube implement 24, while it is easy at the time of with a group to carry out the positioning set of the batch member 36 at the second dummy support 14 and improvement in assembly-operation method is achieved, automatic assembly and set-ization also have easily the advantage of being realizable.

[0055] Furthermore, it is possible to secure the substantial orifice cross section from the free passage hole 54 and two orifice paths 70 and 70 which extend between 62 toward hoop direction both sides being formed between the pressure receiving room 38 and the balanced room 40 in the engine mount 10 of this example again greatly, and the vibrationproofing effectiveness based on a flow operation of a fluid can be acquired much more advantageous.

[0056] As mentioned above, although the example of this invention has been explained in full detail, this is literal instantiation, and this invention is limited only to this example and interpreted.

[0057] For example, the batch member 36 is arranged so that the first tabular metallic ornaments 42 may be located in the pressure receiving room 38 side and the second tabular metallic ornaments 44 may be located in the balanced room 40 side, respectively, and you may make it the direction of the closed-end cylindrical section of tabular metallic ornaments located in the balanced room 40 side serve as a major diameter from the closed-end cylindrical section of tabular metallic ornaments located in the pressure receiving room 38 side.

[0058] Moreover, although two orifice paths 70 and 70 which extend by the die length of an abbreviation semicircle were formed in the hoop direction in the periphery edge of the batch member 36 in said example, respectively, it is also possible to adopt as a hoop direction one orifice path which extends by the die length below a semicircle or more than a semicircle.

[0059] In addition, the orifice path which extends by the die length of round weakness in a hoop direction the periphery edge of the batch member 36 For example, while preparing the batch projection which divides with one on a periphery the annular dead air space formed from the peripheral face at the method of the outside of the direction of a path between a projection, the first tabular metallic ornaments 42, and the second tabular metallic ornaments 44 to rubber membrane 46 On both sides of this batch projection, it is advantageously formed by opening annular dead air space for free passage in the pressure receiving room 38 and the balanced room 40.

[0060] Moreover, it is also possible to form in the annular projected part 64 the annular concave which is open for free passage in annular dead air space in addition to such a batch projection, and to make the interior of the batch member 36 into the orifice path which extends by the die length more than a round.

[0061] Furthermore, although the batch member 36 is positioned by the second dummy support 14 in said example by inserting in the closed-end cylindrical section 56 of the second tabular metallic ornaments 44 in the metallic tube implement 24, such positioning structure is not indispensable in this invention.

[0062] Moreover, although each of first and second plate was constituted from said example by the tabular metallic ornaments formed of press forming etc., it is also possible to form both these firsts, and the second both [one side or] with hard material, such as rigid resin, also in such a case, the manufacture disposition superiors by simplification of a die are planned, and the same effectiveness as said example may be demonstrated.

[0063] in addition -- although this invention was applied to the engine mount for automobiles and one example was shown in said example -- this invention -- in addition, body mounting for automobiles -- or all may be advantageously applied to various kinds of vibrationproofing mountings of those other than an automobile.

[0064] In addition, although listing is not carried out one by one, this invention may be carried out in the mode which added modification which becomes various, correction, amelioration, etc. based on this contractor's knowledge, and unless such an embodiment deviates from the meaning of this invention, all are contained within the limits of this invention.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing of longitudinal section showing the engine mount as one example of this invention.

[Drawing 2] It is the top view of the first tabular metallic ornaments which constitutes the engine mount shown in drawing 1 .

[Drawing 3] It can set to drawing 2 . III-III It is a sectional view.

[Drawing 4] It is the top view of the second tabular metallic ornaments which constitutes the engine mount shown in drawing 1 .

[Drawing 5] It is a V-V sectional view in drawing 4 .

[Drawing 6] It is the top view of the rubber membrane which constitutes the engine mount shown in drawing 1 .

[Drawing 7] It can set to drawing 6 . VII-VII It is a sectional view.

[Description of Notations]

10 Engine Mount

12 First Dummy Support

14 Second Dummy Support

16 Rubber Elasticity Object

32 Diaphragm

36 Batch Member

38 Pressure Receiving Room

40 Balanced Room

42 First Tabular Metallic Ornaments

44 Second Tabular Metallic Ornaments

46 Rubber Membrane

48 Closed-end Cylindrical Section

50 Flange

56 Closed-end Cylindrical Section

58 Flange

64 Annular Projected Part

70 Orifice Path

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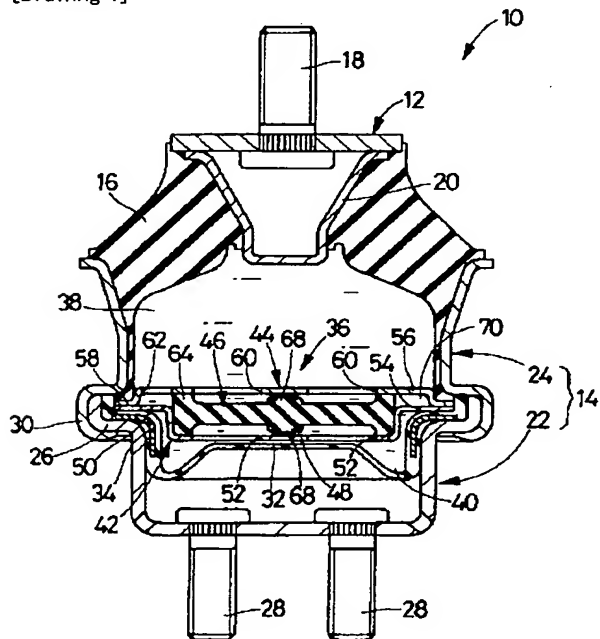
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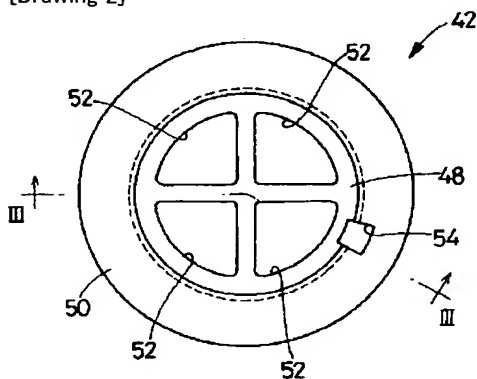
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DRAWINGS

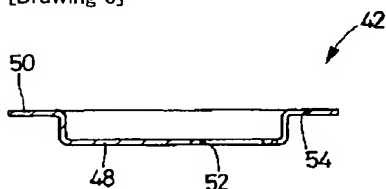
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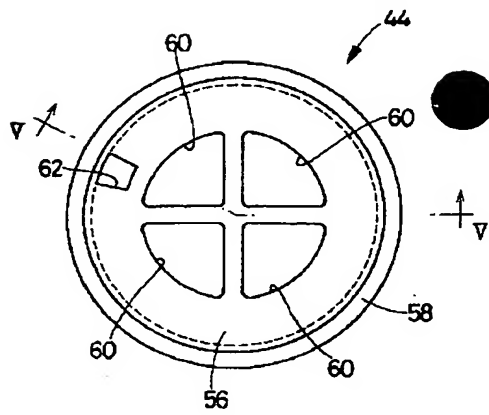
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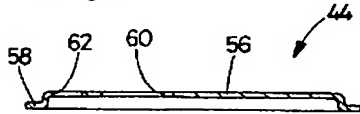
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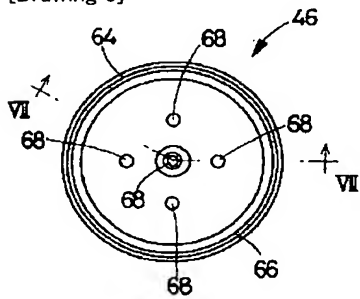
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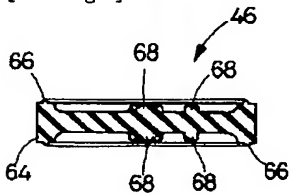
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]

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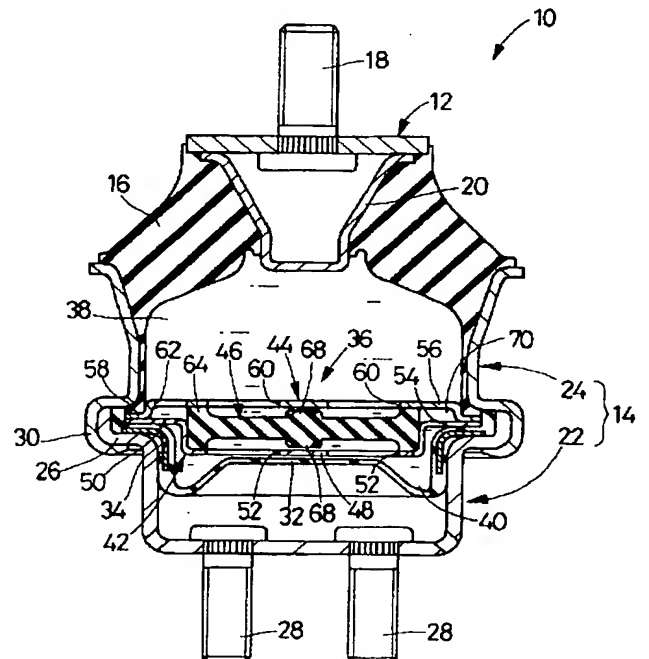
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(54)【発明の名称】 流体封入式防振マウント

(57)【要約】

【目的】 流体封入式防振マウントにおいて、受圧室と平衡室を仕切ると共に、オリフィス通路および液圧吸収機構を構成する仕切部材の製作性および組付性の向上を図ること。

【構成】 有底円筒状部48とフランジ部50からなる第一の板状金具42と、該第一の板状金具42の有底円筒状部48より大径の有底円筒状部56とフランジ部58からなる第二の板状金具44を、開口側を向かい合わせて重ね合わせる一方、第一の板状金具42の有底円筒状部48にゴム膜46を挿入して外周面を位置決め保持せしめると共に、該ゴム膜46の外周縁部に形成した環状突部64を、第一及び第二の板状金具42、44間で挟圧把持せしめることにより、第二の板状金具44の有底円筒状部56内における該ゴム膜46の環状突部64より外周側にオリフィス通路70を形成した。



【特許請求の範囲】

【請求項1】 第一の支持金具と第二の支持金具をゴム弾性体により連結すると共に、該第二の支持金具に支持された仕切部材の両側に、壁部の一部が前記ゴム弾性体にて構成された受圧室と、壁部の一部が可撓性膜にて構成された平衡室を形成し、それら受圧室及び平衡室に所定の非圧縮性流体を封入する一方、前記仕切部材を第一の板状体と第二の板状体の重ね合わせ構造とし、それら両板状体間の外周部分に、前記受圧室と前記平衡室を相互に連通するオリフィス通路を設けると共に、それら両板状体間の中央部分にゴム膜を変位可能に配設し、該ゴム膜の両側を前記受圧室および平衡室にそれぞれ連通せしめてなる流体封入式防振マウントにおいて、前記第一の板状体および第二の板状体を、それぞれ有底円筒状部とフランジ部からなるハット形状として、互いに開口側を向かい合わせて重ね合わせる一方、該第一の板状体の有底円筒状部よりも該第二の板状体の有底円筒状部を大径として、該第一の板状体の有底円筒状部に前記ゴム膜を挿入して外周面を位置決め保持せしめると共に、該ゴム膜の外周縁部に環状突部を設けて該環状突部を前記第一及び第二の板状体間で挟圧把持せしめることにより、かかるゴム膜をそれら第一及び第二の板状体間に配設し、前記第二の板状体の有底円筒状部内における該ゴム膜の環状突部より外周側に前記オリフィス通路を形成したことを特徴とする流体封入式防振マウント。

【発明の詳細な説明】

【0001】

【技術分野】本発明は、受圧室と平衡室を仕切る仕切部材にオリフィス通路が形成されて、該オリフィス通路を通じて流動する流体の流動作用に基づいて防振効果が発揮される流体封入式防振マウントに係り、特に仕切部材の製作性および組付性に優れた流体封入式防振マウントに関するものである。

【0002】

【背景技術】従来から、自動車用エンジンマウントやボデーマウント等、振動伝達系を構成する部材間に介装されてそれらを防振連結するマウント装置の一種として、第一の支持金具と第二の支持金具を、それらの間に介装されたゴム弾性体にて連結してなる構造のものが知られている。また、近年では、より高度な防振効果を得るために、第二の支持金具に支持された仕切部材の両側に、それぞれ所定の非圧縮性流体が封入された受圧室と平衡室を形成すると共に、それら受圧室と平衡室を相互に連通するオリフィス通路を設けてなる流体封入式防振マウントが提案されている。更に、このような流体封入式防振マウントにおいては、高周波数域の防振特性を向上するために、受圧室と平衡室の間にゴム膜を変位可能に配設し、かかるゴム膜の変位に基づいて受圧室の小さな内圧変動を吸収するようにした液圧吸収機構が、好適に採用される。

【0003】具体的には、かかる流体封入式防振マウントにおいては、一般に、実開昭63-66643号公報等に開示されているように、受圧室と平衡室を仕切る仕切部材が二枚の板状体（一般に、プレス成形された板状金具）の重ね合わせ構造とされており、それら両板状金具間の外周部分に環状のオリフィス通路が形成される一方、両板状金具間の中央部分にゴム膜が変位可能に配設され、該ゴム膜の両側が受圧室および平衡室に連通せしめられて液圧吸収機構が構成されている。

【0004】ところが、このような液圧吸収機構を採用するためには、プレス加工等によって一方の板状金具を環状に凹陥させて他方の板状金具に当接させることにより、外周部分に形成されるオリフィス通路と中央部分に形成されるゴム膜の配設部分とを仕切る必要がある。そこにおいて、オリフィス通路とゴム膜の配設部分との仕切りが不十分だと、オリフィス通路の短絡や流体のリーク等が発生し、流体の流動作用に基づいて発揮される防振効果を十分に得ることができなくなる。

【0005】そのために、従来では、板状金具に高い寸法精度が要求され、その製造が難しいことに加え、オリフィス通路の短絡等によってマウント防振特性がばらつき易く、所期の防振効果を安定して得難いという問題があった。

【0006】なお、特開昭60-252834号公報には、円板形状を呈する二枚の板状金具をゴム膜を挟んで重ね合わせて、ゴム弾性体に嵌め込むことにより、それら板状金具とゴム膜をゴム弾性体によって位置決めすると共に、ゴム膜の外周面とゴム弾性体との間に環状のオリフィス通路を形成してなる構造の仕切部材を備えた防振マウントが提案されている。

【0007】しかしながら、かかる防振マウントにおいては、仕切部材を構成する板状金具とゴム膜の位置決めを、ゴム弾性体への組付時にゴム弾性体に対して行なう必要があるために、仕切部材の組付作業が面倒であると共に、位置決め精度が悪く、しかもゴム弾性体やゴム膜の変形によってオリフィス通路の形状が変化するという問題があり、安定した防振効果が得られ難いという問題があった。

【0008】また、特開昭62-184254号公報には、略円板形状を呈する二枚の板状金具間の全体にゴム膜を挟み込んで挟圧保持せしめて、該ゴム膜に形成された環状凹溝によりオリフィス通路を形成してなる構造の仕切部材を備えた防振マウントが提案されている。

【0009】しかしながら、かかる防振マウントにおいては、組付時に二枚の板状金具によってゴム膜に及ぼされる挟圧力等によりゴム膜が変形し、ゴム膜に形成されたオリフィス通路の形状が変化し易いために、目的とする防振効果が得られ難いという問題があった。

【0010】更にまた、特開昭63-167141号公報には、ゴム膜の外周部分に環状のくびれ部を設けると

共に、二枚の板状金具にそれぞれ一づれ部に係合する環状係合部を突出形成して、ゴム膜を中央部分に保持し、ゴム膜の外周側にオリフィス通路を形成してなる構造の仕切部材を備えた防振マウントが提案されている。

【0011】しかしながら、かかる防振マウントにおいては、ゴム膜および各板状金具がいずれも複雑な形状となるために、製造が難しいと共に、それら各部材の組付時の位置合わせが面倒であるという問題があった。

【0012】

【解決課題】ここにおいて、本発明は、上述の如き事情を背景として為されたものであって、その解決課題とするところは、オリフィス通路と液圧吸収機構を構成するゴム膜の配設部分が十分な液密性をもって仕切られる、新規な構造の仕切部材を備えてなる流体封入式防振マウントを提供することにある。

【0013】また、本発明は、シンプルな形状の板状体とゴム膜によって構成された、製造容易な仕切部材を備えてなる流体封入式防振マウントを提供することも、目的とする。

【0014】更にまた、本発明は、板状体に対するゴム膜の組み付けを容易に、且つ優れた位置決め性をもって行なうことのできる仕切部材を備えてなる流体封入式防振マウントを提供することも、目的とする。

【0015】さらに、本発明は、ゴム膜の変形等によるオリフィス通路の形状の変化が可及的に防止される仕切部材を備え、目的とする防振効果を安定して得ることのできる流体封入式防振マウントを提供することも、目的とする。

【0016】

【解決手段】そして、これらの課題を解決するために、本発明の特徴とするところは、第一の支持金具と第二の支持金具をゴム弾性体により連結すると共に、該第二の支持金具に支持された仕切部材の両側に、壁部の一部が前記ゴム弾性体にて構成された受圧室と、壁部の一部が可撓性膜にて構成された平衡室を形成し、それら受圧室及び平衡室に所定の非圧縮性流体を封入する一方、前記仕切部材を第一の板状体と第二の板状体の重ね合わせ構造とし、それら両板状体間の外周部分に、前記受圧室と前記平衡室を相互に連通するオリフィス通路を設けると共に、それら両板状体間の中央部分にゴム膜を変位可能に配設し、該ゴム膜の両側を前記受圧室および平衡室にそれぞれ連通せしめてなる流体封入式防振マウントにおいて、前記第一の板状体および第二の板状体を、それぞれ有底円筒状部とフランジ部からなるハット形状として、互いに開口側を向かい合わせて重ね合わせる一方、該第一の板状体の有底円筒状部よりも該第二の板状体の有底円筒状部を大径として、該第一の板状体の有底円筒状部に前記ゴム膜を挿入して外周面を位置決め保持せしめると共に、該ゴム膜の外周縁部に環状突部を設けて該環状突部を前記第一及び第二の板状体間で挟圧把持せし

めることにより、かかるゴム膜をそれら第一及び第二の板状体間に配設し、前記第二の板状体の有底円筒状部内における該ゴム膜の環状突部より外周側に前記オリフィス通路を形成したことにある。

【0017】

【発明の効果】このような本発明に従う構造とされた流体封入式防振マウントにおいては、ゴム膜の外周縁部に形成された環状突部が第一及び第二の板状体間で挟圧されることにより、かかる環状突部がシール材として機能して、オリフィス通路と液圧吸収機構を構成するゴム膜の配設部分とが、十分な液密性をもって仕切られることから、オリフィス通路の短絡等が防止されて、安定した防振効果が発揮され得る。

【0018】また、かかる流体封入式防振マウントにおいては、第一及び第二の板状体がいずれも単純なハット形状をもって形成されると共に、それ程高い寸法精度を出さなくてもオリフィス通路のシール性がゴム膜の環状突部によって確保されることから仕切部材、ひいてはマウントの製造が容易である。

【0019】更にまた、かかる流体封入式防振マウントにおいては、第一の板状体の有底円筒状部内にゴム膜を挿入するだけで、かかる有底円筒状部の筒壁部内周面によりゴム膜の外周面が全周に亘って保持されて位置決めされることから、ゴム膜の組み付けが容易であると共に、優れた位置決め性が発揮され得る。

【0020】さらに、かかる流体封入式マウントにおいては、第一の板状体のフランジ部と第二の板状体の有底円筒状部の外周部分との間に、それら第一及び第二の板状体によってオリフィス通路を形成することができるのであり、それによって、ゴム膜の変形時におけるオリフィス通路の形状変化を防止して、目的とする防振効果を安定して得ることが可能となる。

【0021】

【実施例】以下、本発明を更に具体的に明らかにするために、本発明の実施例について、図面を参照しつつ、詳細に説明する。

【0022】先ず、図1には、本発明の実施例としての自動車用エンジンマウント10が示されている。かかるエンジンマウント10は、第一の支持金具12と第二の支持金具14がゴム弾性体16にて連結されてなる構造とされている。そして、第一の支持金具12と第二の支持金具14のいずれか一方がボデー側に、他方がパワーユニット側に、それぞれ取り付けられることにより、パワーユニットをボデーに弾性支持せしめるようになっている。また、そのような装着状態下、エンジンマウント10には、第一の支持金具12と第二の支持金具14の対向方向（図1中、上下方向）に、防振すべき主たる振動が入力されることとなる。

【0023】より詳細には、第一の支持金具12は、略厚肉の円板形状を呈している。また、かかる第一の支持

5 金具12の下面には、テーパ状に拡開する筒壁部を有する有底円筒形状のリテーナ20が、開口部において固着されている。更に、第一の支持金具12の中央部分には、取付ボルト18が、外方に突出して固設されている。

【0024】一方、第二の支持金具14は、略有底円筒形状を呈する底金具22と、略円筒形状を呈する筒金具24とによって構成されている。底金具22は、開口周縁部に外フランジ部26を有しており、また、その底壁部には、二本の取付ボルト28、28が、外方に突出して固設されている。更に、筒金具24は、軸方向一方の開口側の筒壁部がテーパ形状を呈していると共に、軸方向他方の開口部にかしめ部30を有している。そして、これら底金具22と筒金具24が軸方向に重ね合わされ、底金具22の外フランジ部26に筒金具24のかしめ部30がかしめ固定されることにより、第二の支持金具14が形成されている。

【0025】また、第一の支持金具12と第二の支持金具14は、略同一軸上で所定距離を隔てて対向配置されており、それらの間に、ゴム弾性体16が介装されている。かかるゴム弾性体16は、全体として略円錐台形状を呈しており、その小径側端面が第一の支持金具12に固着されている一方、大径側外周面が第二の支持金具14を構成する筒金具24に固着されている。それによって、ゴム弾性体16により、第一の支持金具12と第二の支持金具14が弾性的に連結されていると共に、第二の支持金具14の開口部が流体密に閉塞されている。

【0026】さらに、第二の支持金具14の内部には、可撓性膜としてのダイヤフラム32が收容配置されている。このダイヤフラム32は、薄肉ゴムによって構成されており、外周縁部には環状の取付金具34が固着されている。そして、かかるダイヤフラム32は、取付金具34が固着された外周縁部を、底金具22と筒金具24のかしめ部で挟持されることによって、第二の支持金具14に組み付けられている。それによって、第二の支持金具14の内部が、ダイヤフラム32により、筒金具24側と底金具22側とに流体密に仕切られている。

【0027】また、第二の支持金具14の内部には、ダイヤフラム32より筒金具24側に位置して、仕切部材36が收容配置されている。この仕切部材36は、全体として略円盤形状を呈しており、外周縁部をダイヤフラム32の外周縁部に重ね合わされ、該ダイヤフラム32と共に、底金具22と筒金具24のかしめ部で挟持されている。

【0028】それによって、仕切部材36が、第二の支持金具14に対して固定的に取り付けられており、この仕切部材36により、ゴム弾性体16とダイヤフラム32の間に形成された密閉室が、ゴム弾性体16側とダイヤフラム32側に流体密に二分されている。

【0029】さらに、かかる仕切部材36によって二分

6 された密閉室には、ポリアルキレングリコール、ポリアルキレングリコール、シリコン油等の、所定の非圧縮性流体が封入されている。なお、密閉室への流体の封入は、例えば、仕切部材36やダイヤフラム32の組付けを流体中で行なうこと等により、有利に為され得る。

【0030】それにより、仕切部材36を挟んで位置する一方の側（第一の支持金具12側）には、壁部の一部がゴム弾性体16にて構成され、振動入力時にゴム弾性体16の変形に基づいて内圧変動が惹起される受圧室38が形成されている。また、仕切部材36を挟んで位置する他方の側には、壁部の一部がダイヤフラム32にて構成され、該ダイヤフラム32の変形に基づいて容積変化が許容される平衡室40が形成されている。

【0031】また、それら受圧室38と平衡室40を仕切る仕切部材36は、それぞれプレス成形等により形成された第一の板状金具42と第二の板状金具44が、ゴム膜46を挟んで重ね合わされてなる構造とされている。

【0032】第一の板状金具42は、図2及び図3にも示されているように、浅底の有底円筒状部48とフランジ部50からなるハット形状を呈している。また、有底円筒状部48の底壁部には、四個の通孔52が形成されている。更に、フランジ部50には、有底円筒状部48の筒壁部との間に跨がって、一つの連通孔54が形成されている。

【0033】また一方、第二の板状金具44は、図4及び図5にも示されているように、第一の板状金具42と略同様、浅底の有底円筒状部56とフランジ部58からなるハット形状を呈している。そこにおいて、第二の板状金具44の有底円筒状部56は、第一の板状金具42の有底円筒状部48よりも、内径が大きく設定されている。更に、有底円筒状部56の底壁部の中央部分には、四個の通孔60が形成されていると共に、かかる底壁部の外周縁部には、一つの連通孔62が形成されている。

【0034】また、かかる第二の板状金具44の有底円筒状部56の外径は、筒金具24内に形成された受圧室38の内径と略同一かそれより僅かに小さく設定されている。そして、仕切部材36の組付けに際して、第二の板状金具44の有底円筒状部56が筒金具24内に嵌め込まれることにより、該第二の板状金具44が筒金具24に対して位置決めセットされるようになっている。

【0035】そうして、これら第一の板状金具42と第二の板状金具44は、有底円筒状部48、56の開口部が互いに向かい合うようにして軸方向に重ね合わされている。それによって、第一の板状金具42の有底円筒状部48と第二の板状金具44の有底円筒状部56の間に略円板形状の空所が形成されており、かかる空所内にゴム膜46が收容配置されている。

【0036】このゴム膜46は、図6及び図7にも示されているように、全体として略円板形状を呈しており、

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その外径が、第一の板状金具42の有底円筒状部48の内径と略同一とされている。また、ゴム膜46の外周縁部には、軸方向両側に所定高さで突出する環状突部64が、周方向に連続して形成されている。この環状突部64は、軸方向の総高さが、重ね合わされた第一及び第二の板状金具42、44の有底円筒状部48、56の底壁部間の内寸法と略同一かそれより僅かに大きく設定されている。

【0037】なお、環状突部64の軸方向両端面には、それぞれ、環状のシールリップ66が形成されている。また、ゴム膜46の中心部と、該中心部周りの四箇所には、それぞれ、当接突起68が、環状突部64よりも低い高さで突出形成されている。

【0038】そして、かかるゴム膜46は、第一の板状金具42の有底円筒状部48に挿入され、その外周面が有底円筒状部48の内周面に当接されることにより、位置決め保持されている。更に、ゴム膜46の環状突部64は、その軸方向両端面が、第一の板状金具42の有底円筒状部48の底壁部と第二の板状金具44の有底円筒状部56の底壁部とに当接せしめられ、それら両底壁部間で軸方向に挟圧把持されている。

【0039】それによって、第一の板状金具42の有底円筒状部48と第二の板状金具44の有底円筒状部56の間に形成された空所が、ゴム膜46の環状突部64により、該環状突部64よりも内周側部分と外周側部分とに流体密に仕切られている。即ち、第二の板状金具44の有底円筒状部56が、第一の板状金具42の有底円筒状部48よりも大径とされていることにより、ゴム膜46の環状突部64よりも外周側において、周方向に延びる環状空所が、第二の板状金具44の有底円筒状部56内に形成されているのである。

【0040】そして、この環状空所が、第一及び第二の板状金具42、44に設けられた連通路54、62を通じて、平衡室40および受圧室38に連通されていることにより、それら受圧室38と平衡室40を相互に連通するオリフィス通路70が形成されている。

【0041】なお、本実施例では、連通路54と連通路62が、互いに径方向に対向位置するように、第一の板状金具42と第二の板状金具44が周方向に位置決めされており、それによって、それぞれ周方向に略1/2周の長さで延びる二本のオリフィス通路70、70が、形成されている。また、本実施例では、かかるオリフィス通路70を通じて流動する流体の共振作用に基づいて、シェイク等の低周波振動の入力時に減衰効果が発揮されるように、各オリフィス通路70の断面積や長さが設定されている。

【0042】また一方、第一の板状金具42の有底円筒状部48と第二の板状金具44の有底円筒状部56の間において、ゴム膜46の環状突部64よりも内周側に形成された円形空所は、ゴム膜46によって第一の板状金

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具42側と第二の板状金具44側に流体密に仕切られている。更に、それら第一の板状金具42側の空所と第二の板状金具44側の空所が、第一及び第二の板状金具42、44に設けられた通孔52、60を通じて、平衡室40および受圧室38にそれぞれ連通されている。

【0043】それによって、ゴム膜46の両側に受圧室38と平衡室40の内圧が及ぼされ、それら両室38、40間の内圧差に基づいてゴム膜46が変形せしめられることにより、受圧室38と平衡室40との間での少量の流体流動を許容して受圧室38の内圧変動を吸収する液圧吸収機構が構成されている。

【0044】なお、かかるゴム膜46は、その当接突起68が、それぞれ、第一及び第二の板状金具42、44における、通孔52、60が形成されていない部分に対向位置するよう、第一及び第二の板状金具42、44に対して位置決めされている。そして、当接突起68の第一及び第二の板状金具42、44に対する当接により、ゴム膜46の変位量、ひいてはゴム膜46の変形に基づいて流動せしめられる流体流通量が規制されるようになっている。

【0045】また、本実施例では、ゴム膜46の変形に基づいて流動せしめられる流体の流動作用に基づいて、こもり音等の高周波振動の入力時に低動ばね効果が発揮されるように、通孔52、60の大きさ等が設定されている。

【0046】従って、上述の如き構造とされたエンジンマウント10においては、ゴム膜46の外周縁部に形成された環状突部64が第一及び第二の板状金具間で挟圧されることにより、かかる環状突部64が、オリフィス通路70とゴム膜46の配設部分を仕切るシール材として機能する。

【0047】それ故、オリフィス通路70とゴム膜46の配設部分とが、十分な液密性をもって仕切られることとなり、オリフィス通路70の短絡等が防止されて、目的とする防振効果が有効に且つ安定して発揮され得るのである。

【0048】また、かかるエンジンマウント10においては、第一及び第二の板状金具42、44に対して、オリフィス通路70とゴム膜46の配設部分とを仕切る隔壁を突出形成する必要がないことから、それら第一及び第二の板状金具42、44が、いずれも単純なハット形状をもって形成される。

【0049】それ故、第一及び第二の板状金具42、44の製造が容易となると共に、高度な寸法精度が要求されることもなく、マウントの製作性が飛躍的に向上され得るのである。

【0050】更にまた、かかるエンジンマウント10においては、第一の板状金具42の有底円筒状部48内にゴム膜46を挿入するだけで、かかる有底円筒状部48の筒壁部内周面によりゴム膜46の外周面が全周に亘つ

て保持されて位置決めされる。

【0051】それ故、ゴム膜46の第一及び第二の板状金具42、44に対する組み付けが、優れた位置決め性をもって容易に為され得るのであり、それによって、マウント製作性の更なる向上と性能の安定化が図られ得る。

【0052】さらに、本実施例のエンジンマウント10においては、第一の板状金具42のフランジ部50と第二の板状金具44の有底円筒状部56の間に、オリフィス通路70が形成されることから、オリフィス通路70の変形が有利に防止され得る。

【0053】それ故、オリフィス通路70の形状が有利に維持され得て、該オリフィス通路70を通じて流動せしめられる流体の流動作用に基づく所期の防振効果が、有利に且つ安定して発揮され得るのである。

【0054】また、本実施例のエンジンマウント10においては、第二の板状金具44の有底円筒状部56が筒金具24内に嵌め込まれるようになっていることから、組付時に、仕切部材36を第二の支持金具14に位置決めセットすることが容易であり、組立作業性の向上が図られると共に、自動組立て、セット化も容易に実現可能であるという利点もある。

【0055】更にまた、本実施例のエンジンマウント10においては、受圧室38と平衡室40の間に、連通孔54、62間を周方向両側に向かって延びる二本のオリフィス通路70、70が形成されていることから、実質的なオリフィス断面積を大きく確保することが可能であり、流体の流動作用に基づく防振効果を一層有利に得ることができる。

【0056】以上、本発明の実施例について詳述してきたが、これは文字通りの例示であって、本発明は、かかる具体例にのみ限定して解釈されるものではない。

【0057】例えば、第一の板状金具42が受圧室38側に、第二の板状金具44が平衡室40側に、それぞれ位置するように仕切部材36を配設し、受圧室38側に位置する板状金具の有底円筒状部よりも、平衡室40側に位置する板状金具の有底円筒状部の方が大径となるようにしても良い。

【0058】また、前記実施例では、仕切部材36の外周縁部をそれぞれ周方向に略半周の長さで延びる二本のオリフィス通路70、70が形成されていたが、周方向に半周以下、或いは半周以上の長さで延びる一本のオリフィス通路を採用することも可能である。

【0059】なお、仕切部材36の外周縁部を周方向に一周弱の長さで延びるオリフィス通路は、例えば、ゴム膜46に対して、その外周面から径方向外方に突出し、第一の板状金具42と第二の板状金具44の間に形成された環状空所を周上の一か所で仕切る仕切突起を設けると共に、該仕切突起の両側で、環状空所を受圧室38および平衡室40に連通することによって、有利に形成さ

れる。

【0060】また、そのような仕切突起に加えて、環状空所に連通する環状凹溝を環状突部64に形成し、仕切部材36の内部を一周以上の長さで延びるオリフィス通路とすることも可能である。

【0061】さらに、前記実施例では、第二の板状金具44の有底円筒状部56を筒金具24内に嵌め込むことにより、仕切部材36が第二の支持金具14に位置決めされるようになっていたが、そのような位置決め構造は、本発明において必須のものではない。

【0062】また、前記実施例では、第一及び第二の板状体が、いずれもプレス成形等により形成された板状金具によって構成されていたが、それら第一及び第二の板状体の一方或いは両方を、剛性樹脂等の硬質材料によって形成することも可能であり、その場合にも、成形型の簡略化による製作性向上等が図られ、前記実施例と同様な効果が発揮され得る。

【0063】加えて、前記実施例では、本発明を自動車用エンジンマウントに適用したものの一具体例を示したが、本発明は、その他、自動車用ボデーマウントや、或いは自動車以外の各種の防振マウントに対して、何れも有利に適用され得る。

【0064】その他、一々列挙はしないが、本発明は、当業者の知識に基づいて、種々なる変更、修正、改良等を加えた態様において実施され得るものであり、また、そのような実施態様が、本発明の趣旨を逸脱しない限り、何れも、本発明の範囲内に含まれる。

【図面の簡単な説明】

【図1】本発明の一実施例としてのエンジンマウントを示す縦断面図である。

【図2】図1に示されたエンジンマウントを構成する第一の板状金具の平面図である。

【図3】図2におけるIII-III断面図である。

【図4】図1に示されたエンジンマウントを構成する第二の板状金具の平面図である。

【図5】図4におけるV-V断面図である。

【図6】図1に示されたエンジンマウントを構成するゴム膜の平面図である。

【図7】図6におけるVII-VII断面図である。

【符号の説明】

- 10 エンジンマウント
- 12 第一の支持金具
- 14 第二の支持金具
- 16 ゴム弾性体
- 32 ダイヤフラム
- 36 仕切部材
- 38 受圧室
- 40 平衡室
- 42 第一の板状金具
- 44 第二の板状金具

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